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EMERSON
Industrial Automation

Application Note CTAN #250

This Application Note is pertinent to the Unidrive SP Family

CUSTOMISING AN LCD KEYPAD PLUS DISPLAY

Introduction

A Keypad Plus display fitted to a Unidrive SP can have its parameter description and help text customized by the user to a specific application. Armed with an inexpensive CT Comms Cable and a free Windows utility (available on the emersonct.com web site), the customer can easily modify the drive's Keypad Plus to browse only the pertinent application parameters and display those application parameters with text edited to support and enhance the application.

Sample Application

Lets assume that the application is a simple hoist. A Unidrive SP with a Keypad Plus is fitted with a SM-Applications module programmed in SYPT to support a hoist using the built-in position controller. The details of the SYPT software is not important to this example, but assume that the SYPT application has the following seven adjustment parameters:

Hoist Application Adjustment Parameters		
#70.00	**Move Command**	**0 = no operation** **1 = normal move** **2 = home down** **3 = home up** **Note: returns to zero after command has been accepted.**
#70.01	**Target Position**	**meters * 100**
#70.02	**Maximum Speed**	**meters/sec * 100**
#70.03	**Accel Time**	**sec * 100**
#70.04	**Decel Time**	**sec * 100**
#70.05	**Drum Diameter**	**meters * 100**
#70.06	**Gear Ratio**	*** 100**

The problem is that the parameter names and help text for the application menus are generic in the English language for the Keypad Plus, as shown below on the left.

What we would prefer is a more descriptive parameter name, as shown below on the right.

The HELP text for the application menus is also generic and unhelpful.

If we copy the English menus into the "Custom" language and edit the parameter names and help text for parameters #70.00 through #70.06, we can customize the drive to our application. Using the Keypad Plus browsing filter capability, we can further limit browsing to only parameters #70.00 through #70.06 and thus lock the drive to only the application adjustments.

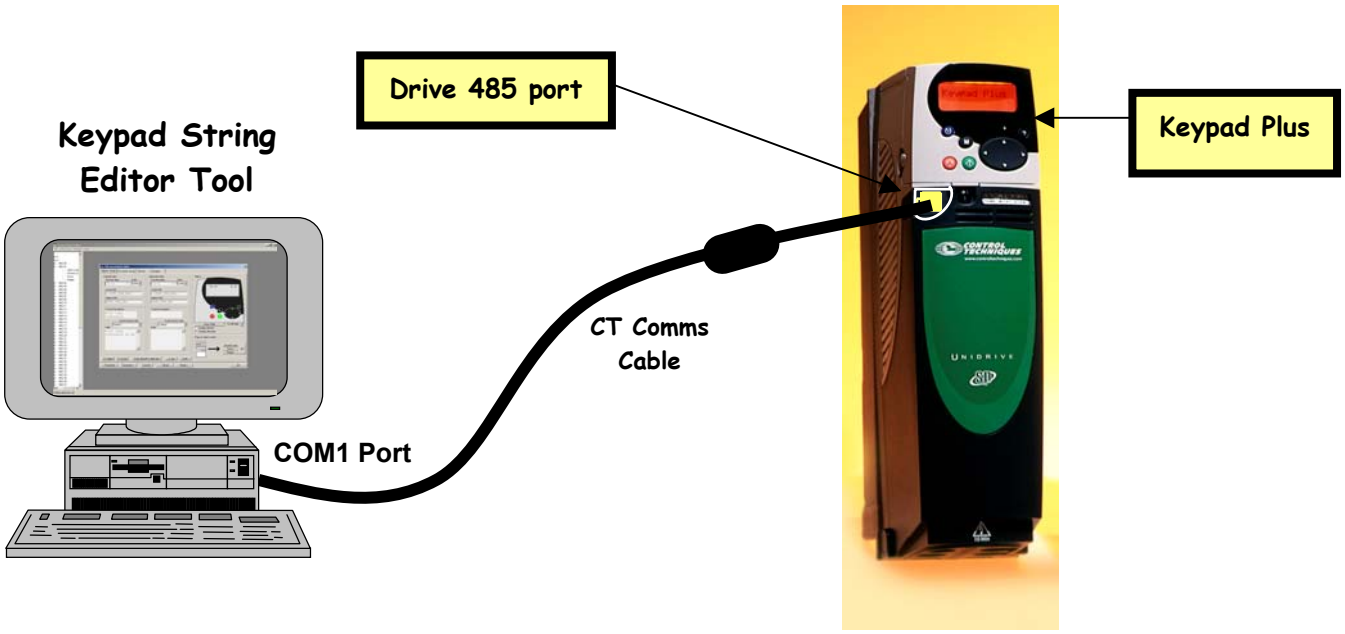
Default Parameter Description (English Language)

Preferred Parameter Description (Custom Language)

The Keypad Plus allows selection of six onboard languages (English, Custom, French, German, Spanish and Italian). The languages English, French, German, Spanish and Italian are fixed at the factory and cannot be modified. The Custom language is modifiable by the user. A special Windows Keypad String Editor tool allows you to copy any of the other languages into the Custom language, make your changes and then download the revised custom language into the Keypad Plus FLASH memory.

Hardware Setup

The Keypad Plus should be fitted directly into the Unidrive SP and a CT Comms Cable attached to the COM1 port of a Windows PC and to the RJ-45 connector on the drive.



Installing the Keypad Plus String Editor Tool

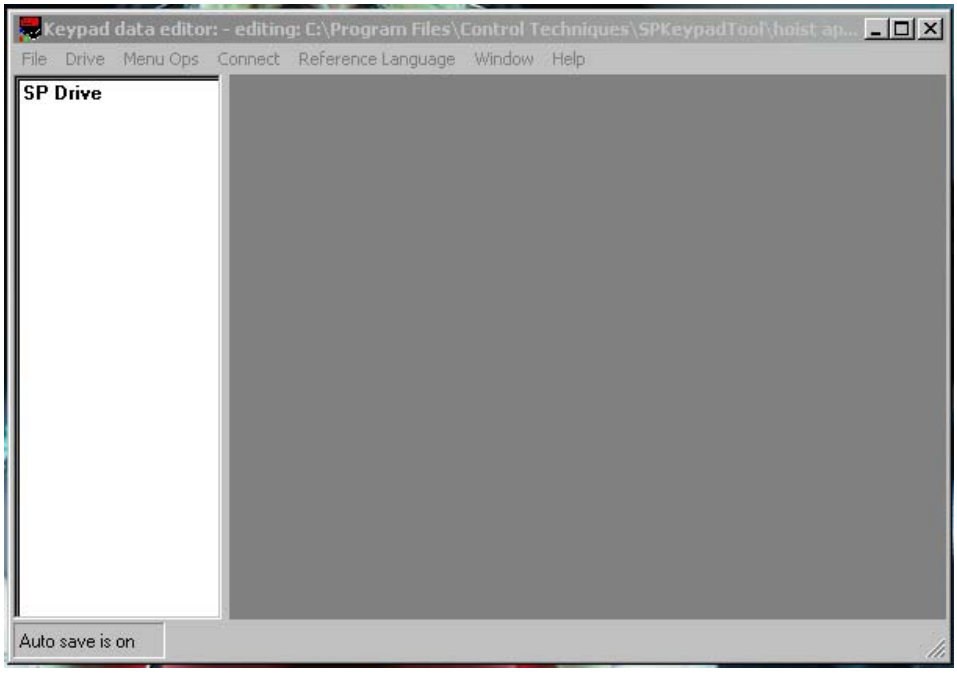
Go to the **emersonct.com** web site and select the “Keypad Plus String Editor” Tool from the download section. This is a self-installing executable and you only need to double-click on it after downloading to start the installation.

After installation, click on the executable UniSP Keypad String Tool.exe to start the application. You should see the following splash screen indicating sucessful installation of the tool.

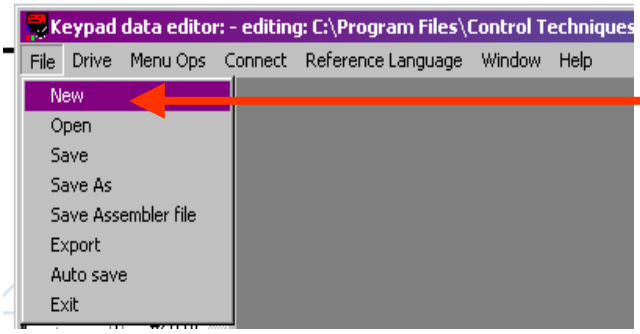
Most savvy Windows users will create a shortcut to the executable, leaving the following icon on the desktop for quick access to the Keypad String Editor program.

Create a Custom String Database File

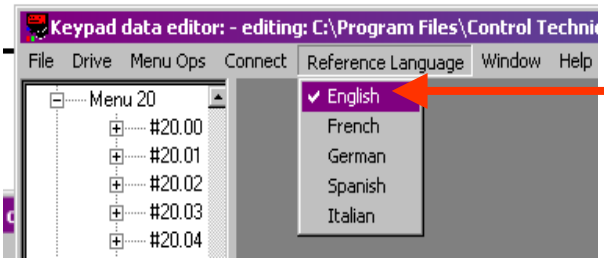
Our first activity is to start the program and create a new Keypad Plus string database file. When the splash screen above has completed, we are presented with the following default main screen.



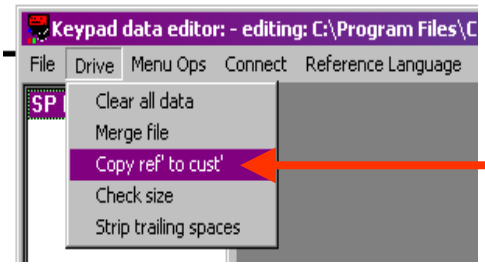
Let's begin by making a fresh start, creating a new Keypad Plus string database file and selecting English as the reference language (appearing on the left in our editor). Montreal customers would naturally select French as the reference language and Mexican customers would select Spanish.



Select File – New to start a fresh string database file.

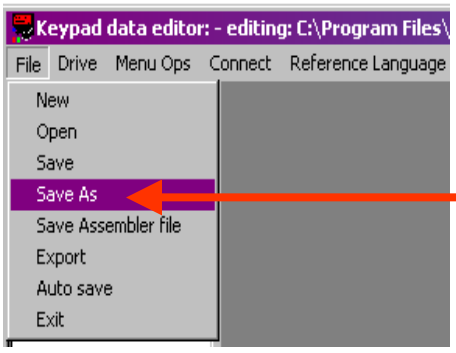


Select Reference Language – English



Copy ref' to cust'

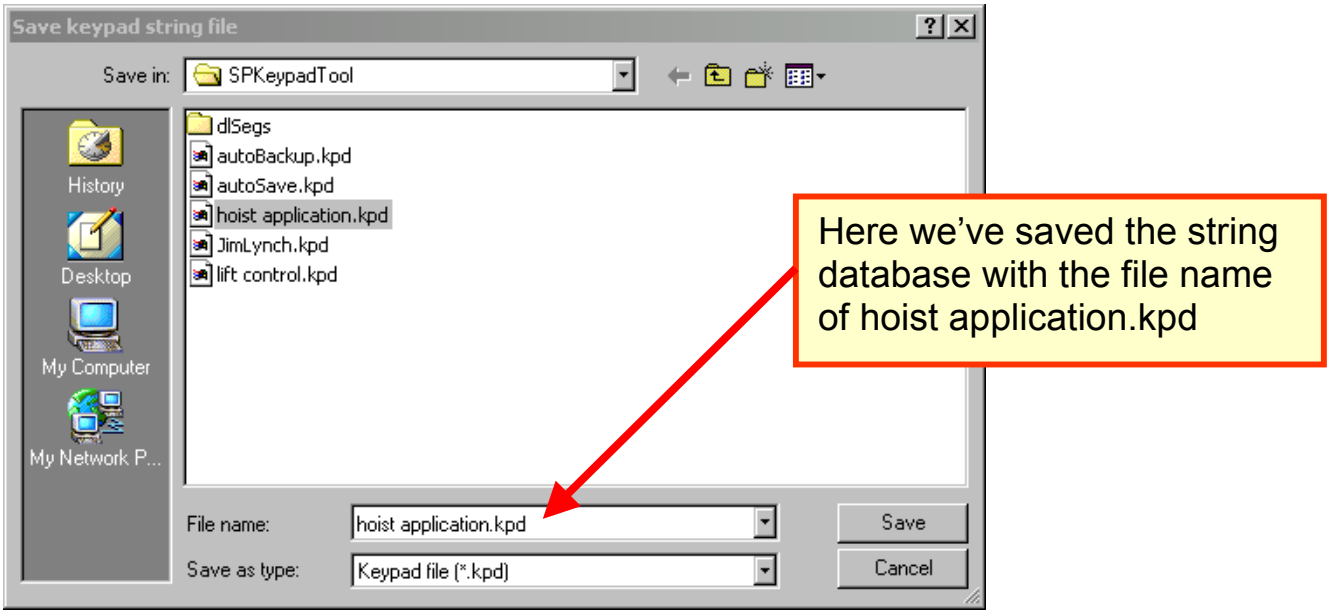
(this copies all parameters from the reference language to the custom language)



Select "File – SaveAs"

(allows us to create a string database file with our own file name)

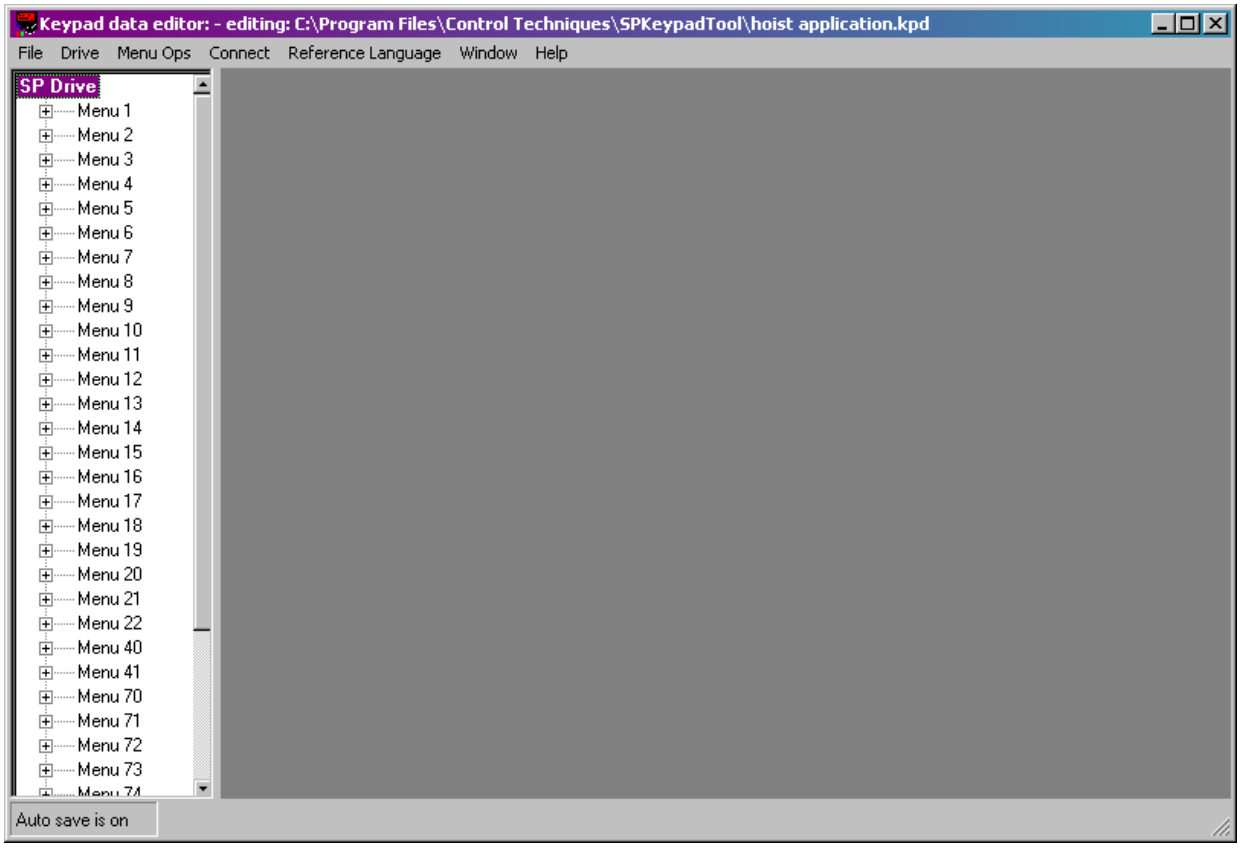
We should pick a file name that is descriptive of our application, so we choose the filename **hoist application.kpd**.



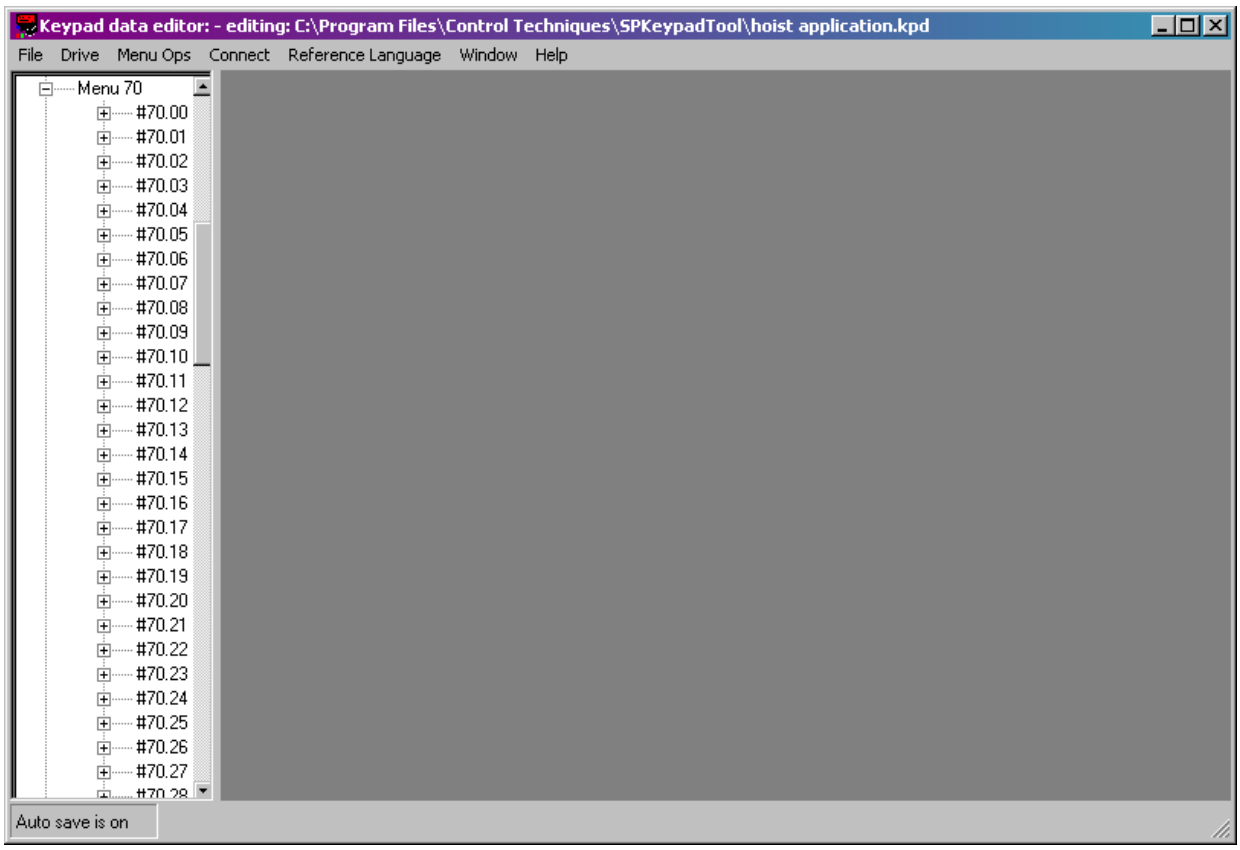
At this point we've created a Keypad Plus string database file wherein the "Custom" language is an exact duplicate of the "English" language. We're now ready to custom edit some of the application parameters in the "Custom" language.

Editing the Parameters

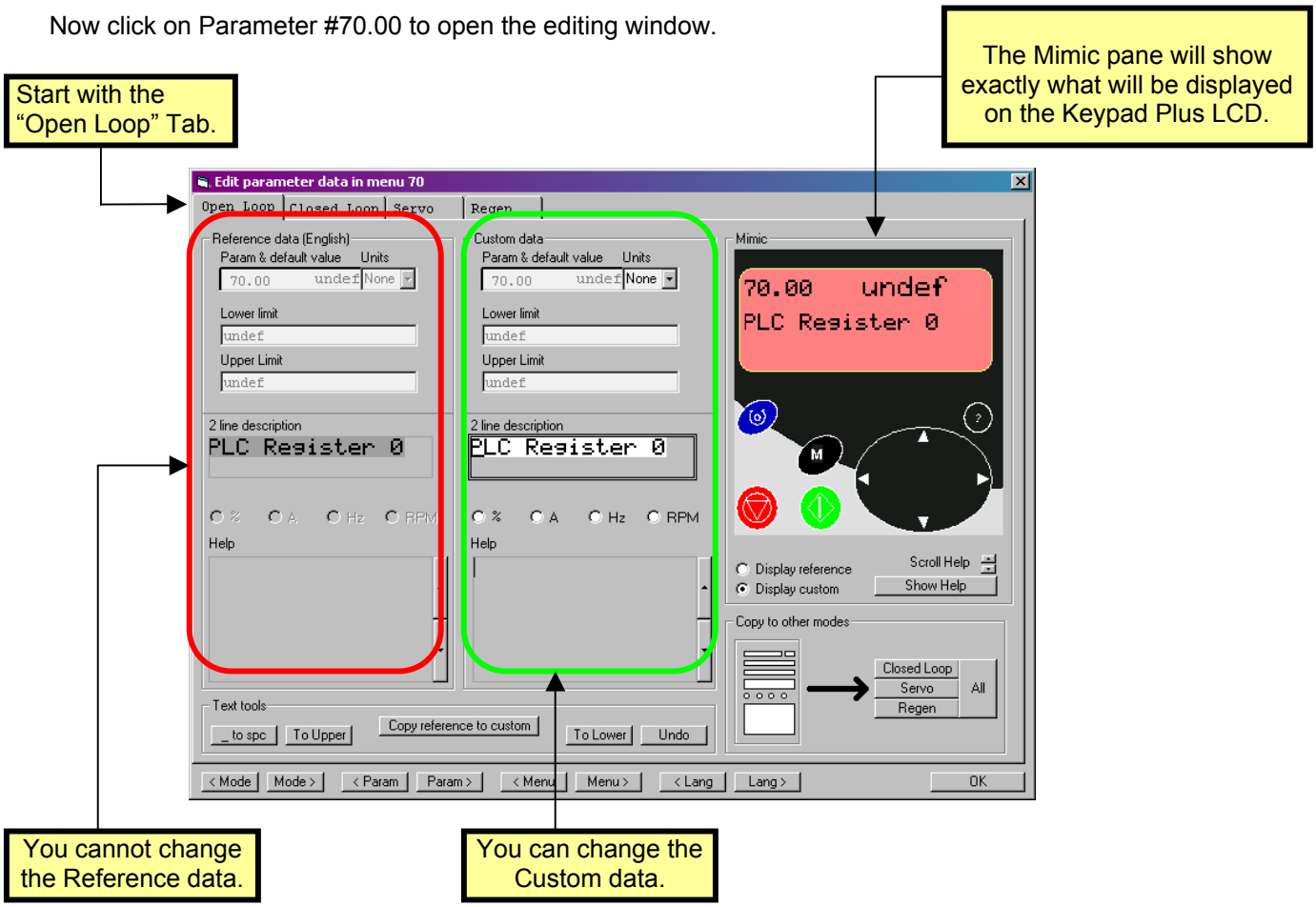
Double-click on SP Drive in the navigation pane on the left to expose the available menus.



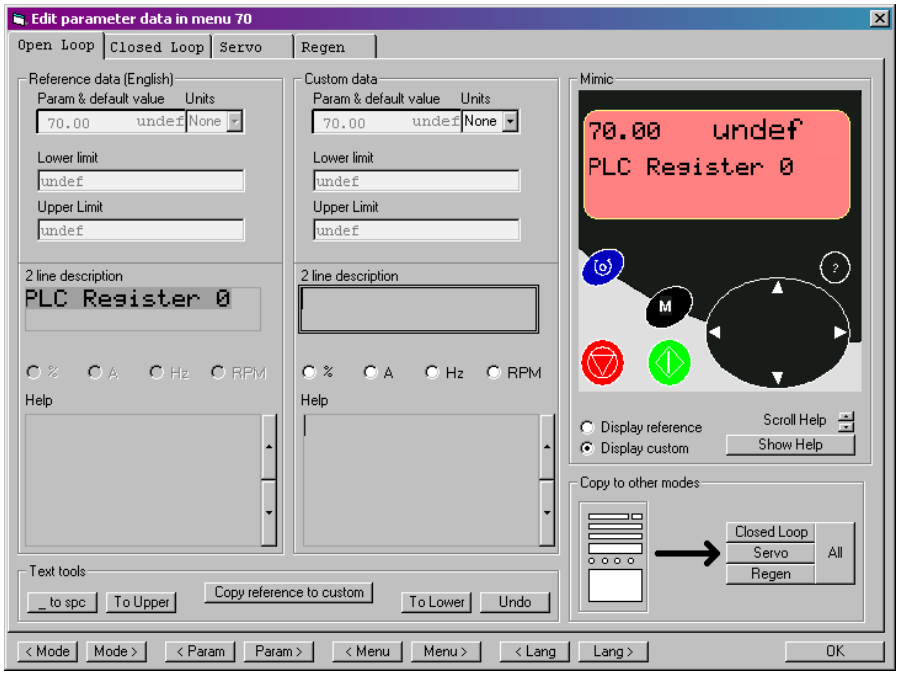
Click on Menu 70 to expose the available parameters.



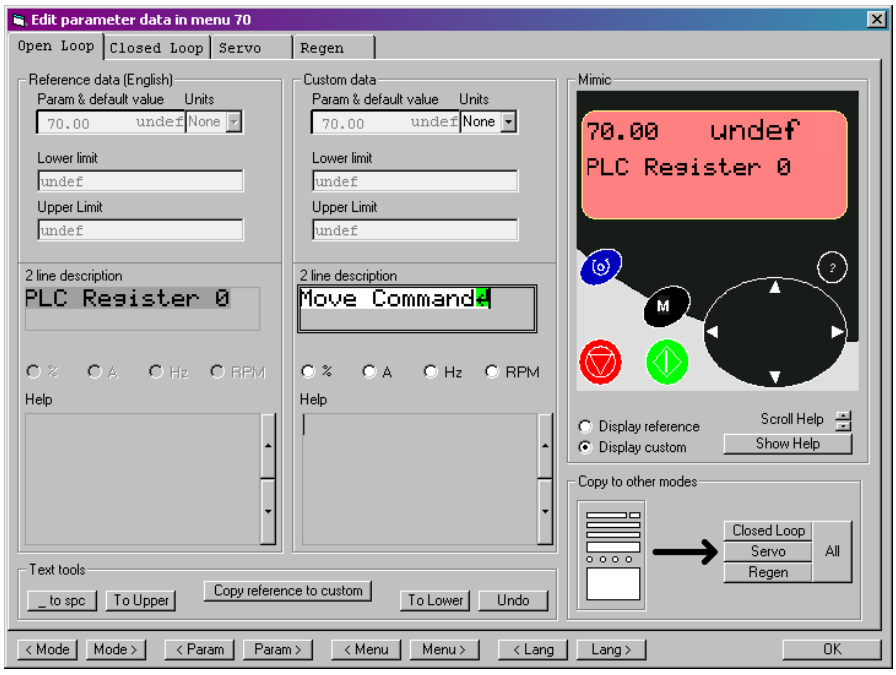
Now click on Parameter #70.00 to open the editing window.



Now erase the default 2 line description and help text, if any. The easiest method is to hold down the mouse button to select the text and then hit the delete key.



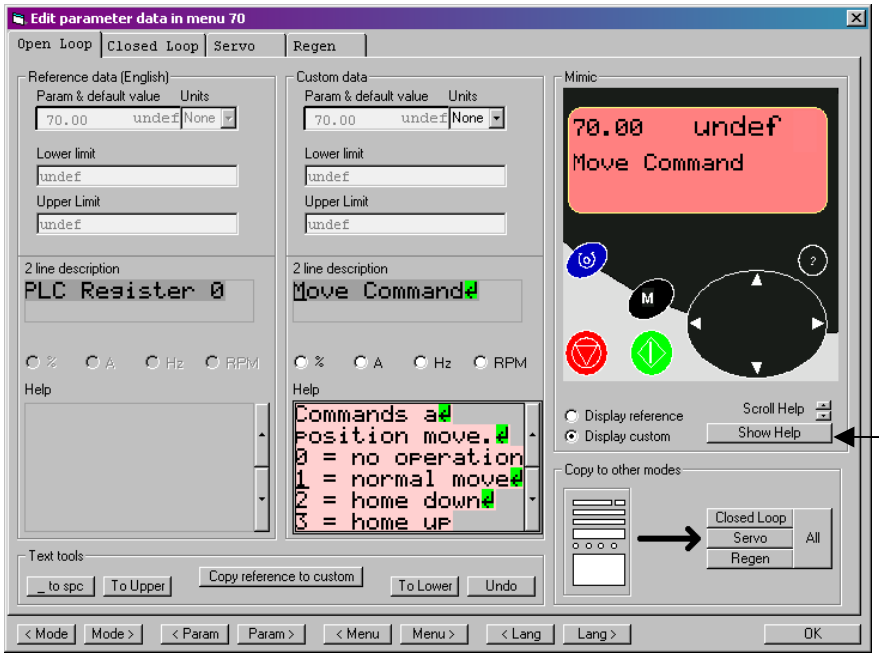
Now type in the 2 line description for parameter #70.00



If the text has trailing spaces at the end of the line, it's helpful to hit the keyboard's **<enter>** key to signify end-of-line. This will cause the editor to insert a <new line> character into the file rather than pad spaces to the right and thus save space in the database file.

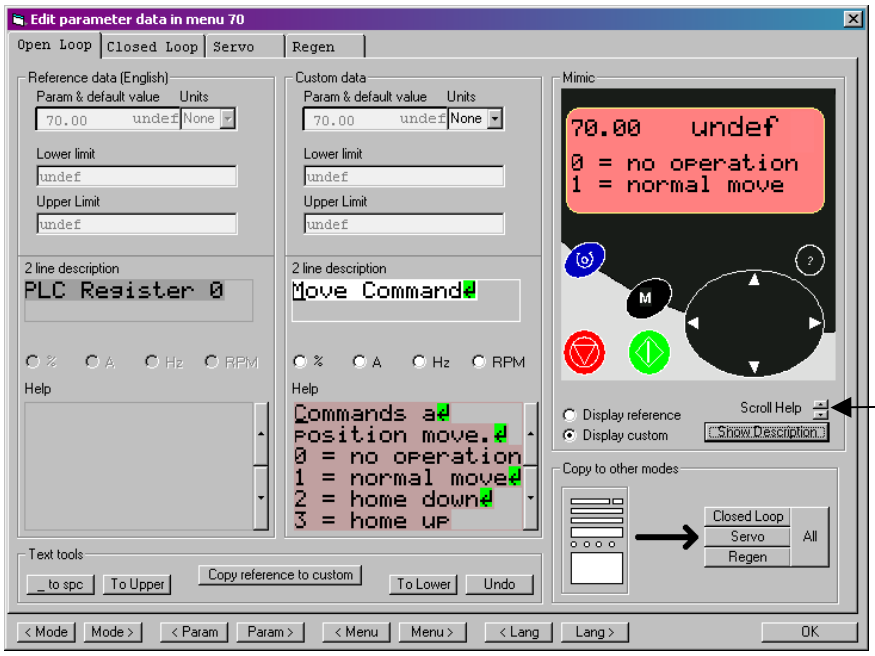
If the parameter has units such as %, A, Hz or RPM, you can click on the units radio buttons to enable display of the type icon. In this case, there are no units for the "move command."

Now we can type in the help text. The same admonition about hitting the **<enter>** key when there are trailing spaces on the right applies – this will save space in our database file.



Click on "**Show Help**" to view the entered Help text.

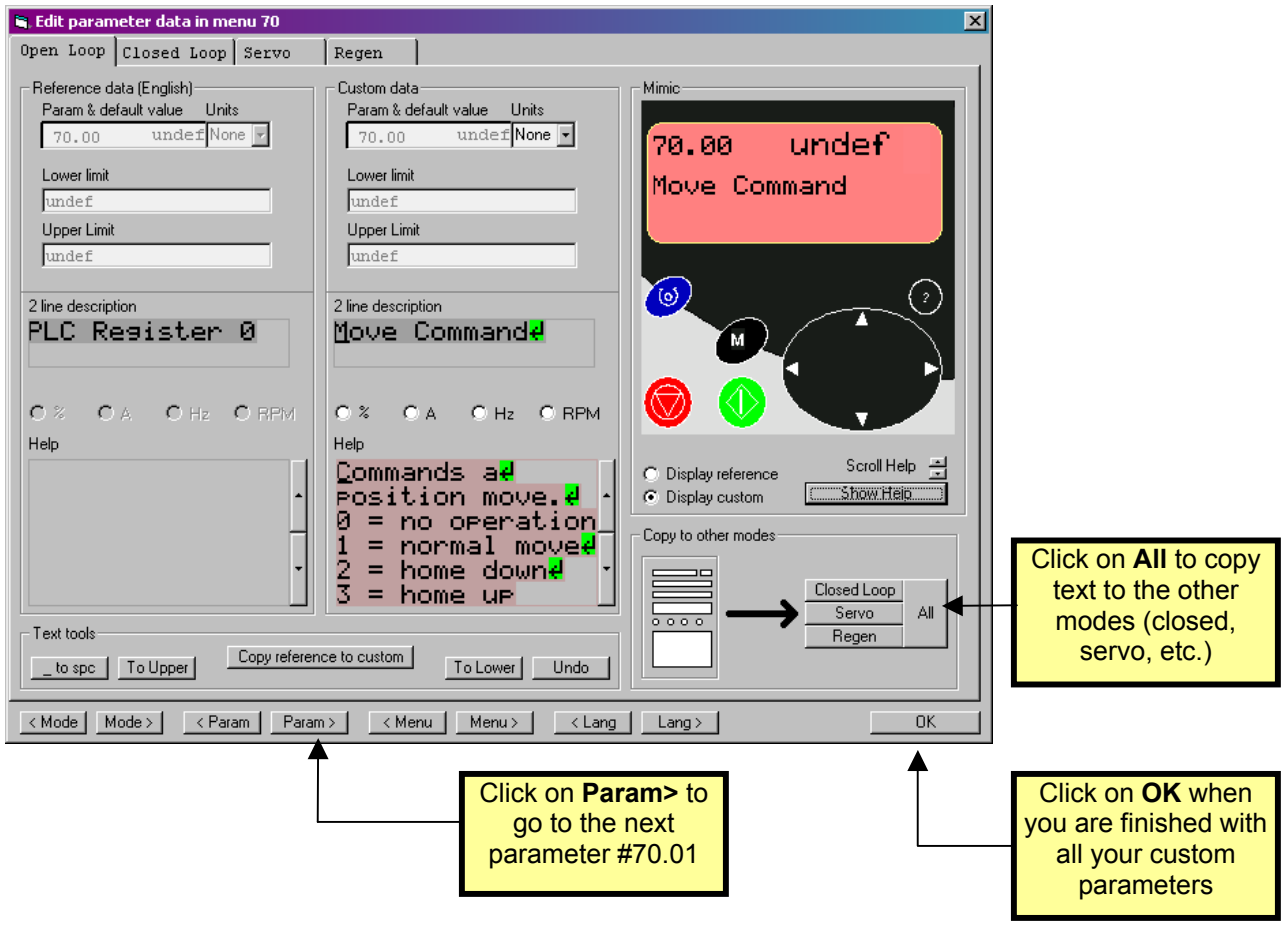
In the Mimic area, you can view the HELP text by clicking on "Show Help" and using the scroll spinners to look at the help text lines.



Use the **up/down** spinners to see all the Help text lines.

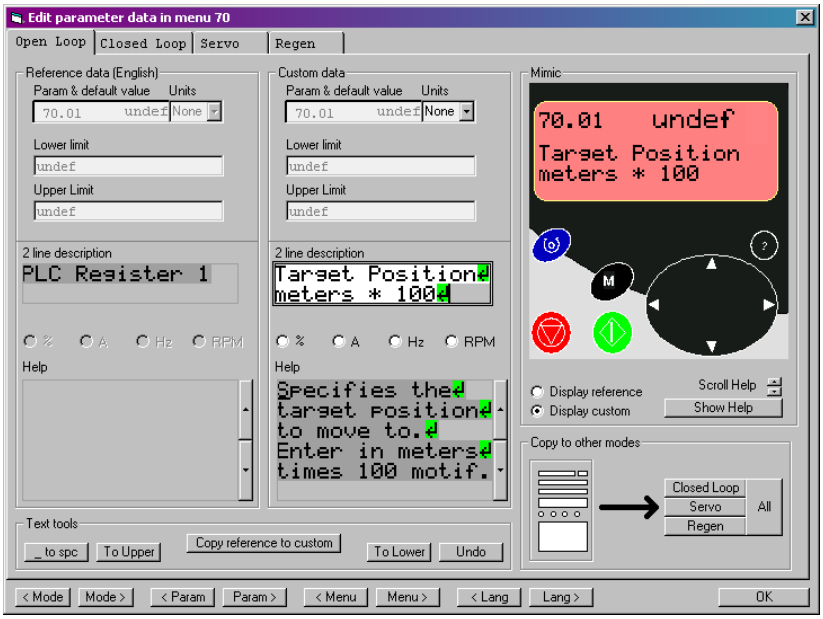
Any drive or SM-Applications parameter may be a candidate for editing. You could change, for example, parameter #5.04 from "Estimated Motor RPM" to "Coater # 4 Line Speed" if desired. Any Control Techniques field engineer working on your system would simply change the language back to English and get the default parameter descriptions while he worked on your drive.

Assuming that the 2-Line Description and Help text for parameter #70.00 is valid for all modes, you can easily copy the changes to the other modes by clicking on "**All**" in the Copy to Other Modes pane.

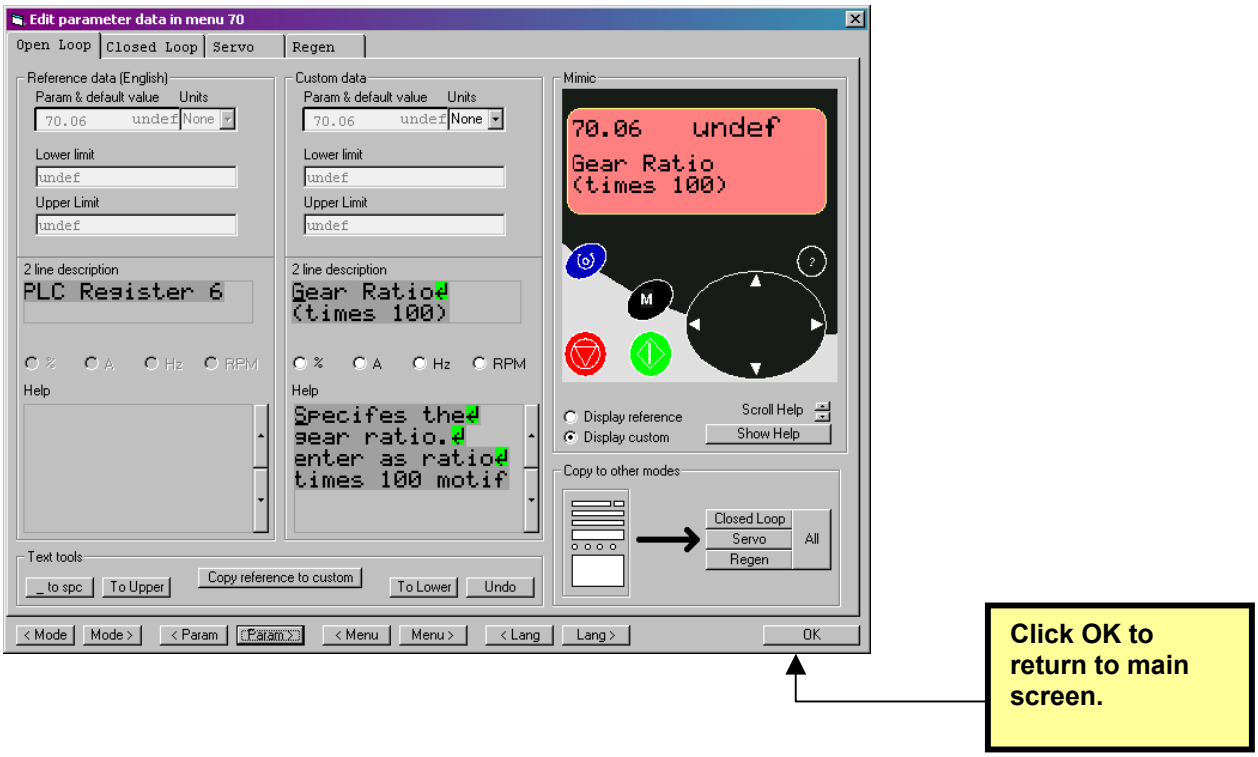


If you click on OK at this point, the editing window closes and you would have to select the next parameter in the navigation pane on the left of the main screen.

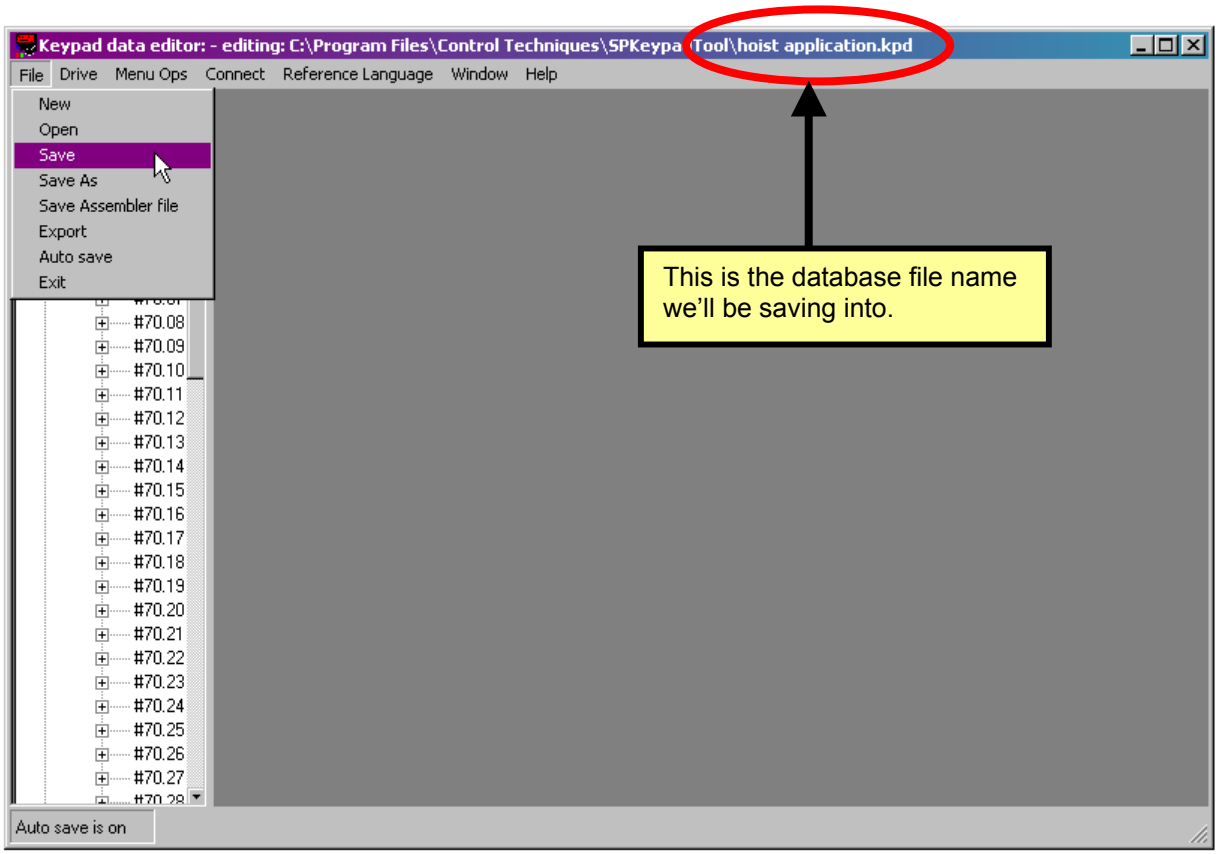
The easiest way to navigate while editing is to hit the **Menu>** and **Param>** buttons to move to the next parameter to be edited. If we click on **Param>** to move to parameter #70.01, we can use the same procedures to create custom description and help text for that parameter. Your work is automatically retained in RAM when you move to the next parameter.



Using the techniques described, complete specification of all remaining parameters up to and including parameter #70.06.

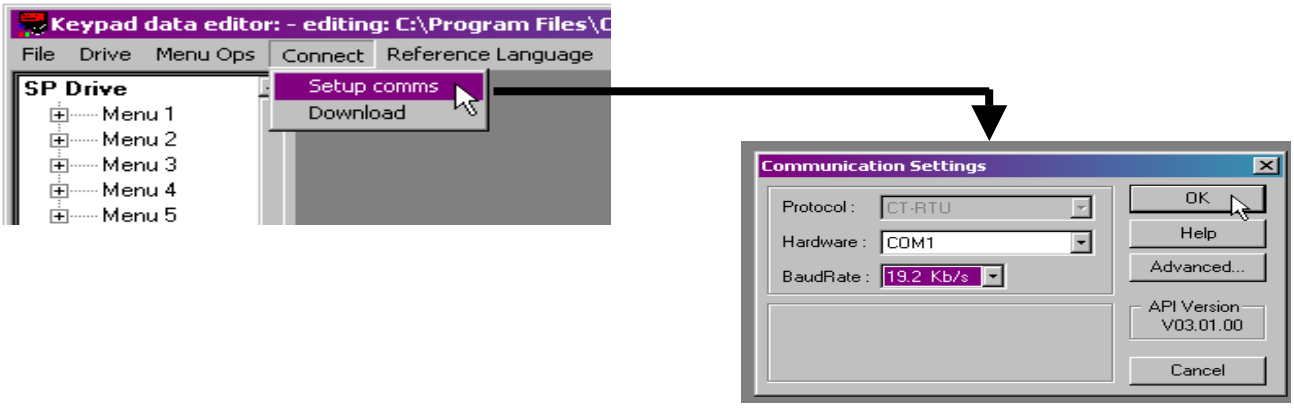


Click on **FILE-SAVE** to save the edited parameters into the database file.



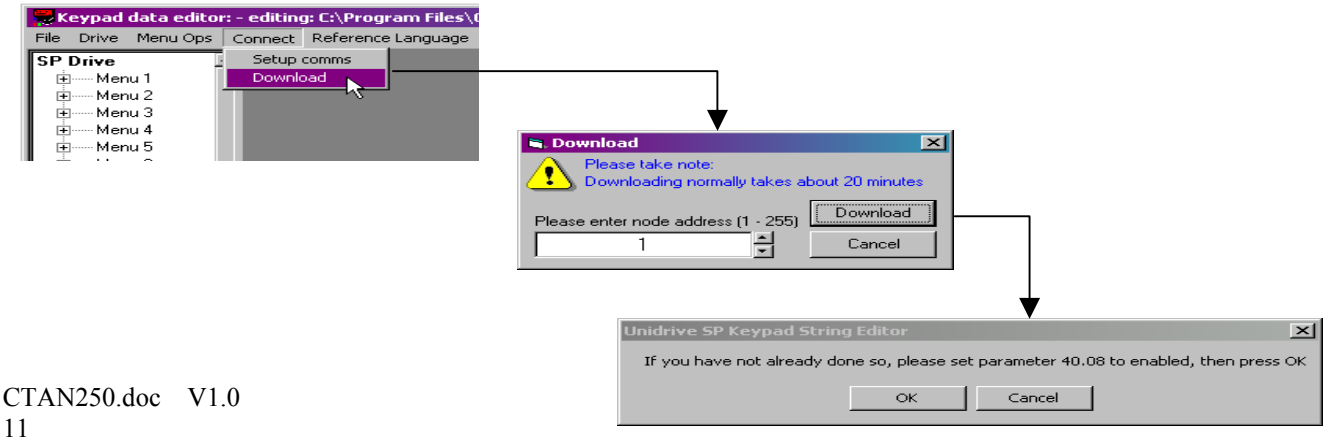
Downloading to the Keypad Plus

First, we have to setup the download communications parameters. We recommend setting 19.2 Kbaud since it is more reliable. The protocol is fixed at Modbus-RTU. You may choose another COM port, if appropriate.

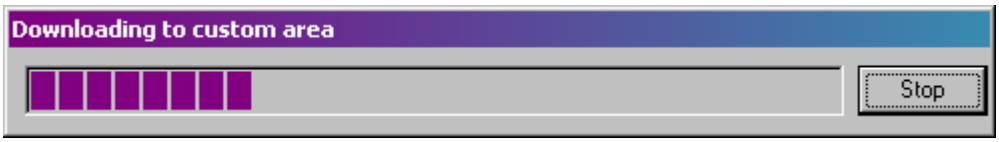


The Keypad Plus has to be set in "**Database Upload Enable**" mode, parameter #40.08. While in this mode, no other Keypad operations are possible. It will literally wait for you to start downloading.

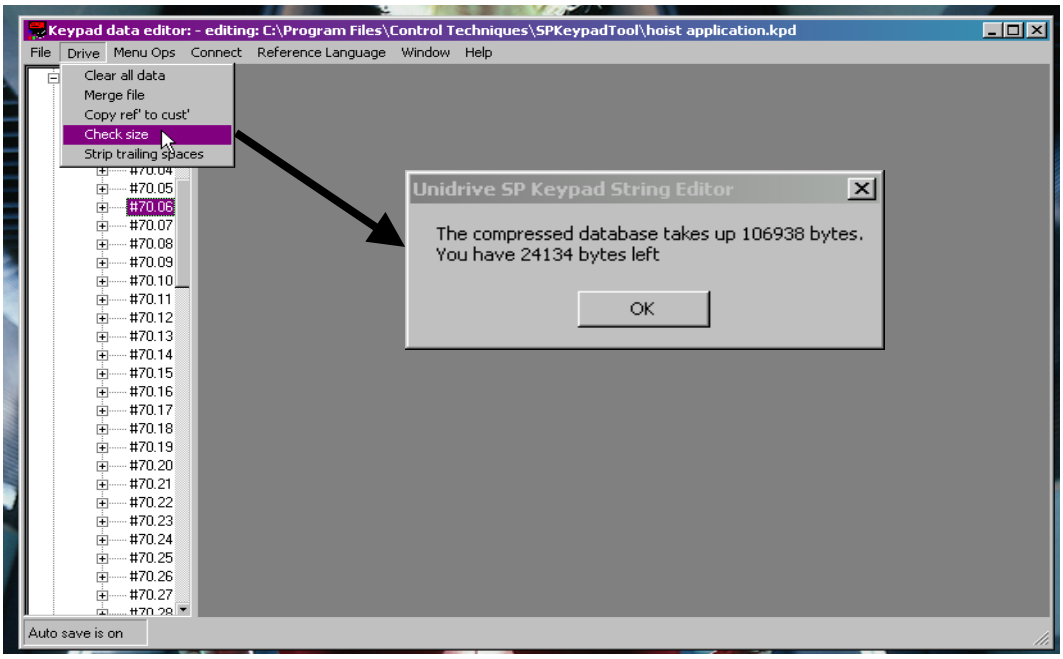
Use the CONNECT menu to start downloading, as shown below. Note that if the drive has a serial address other than 1, you may specify it before commencing.



Downloading will take about 15 to 20 minutes using the CT COMMS cable.



You can check the size of your custom database by selecting Drive – Check Size. Languages are limited to 128 Kbytes. In this example, we still have 24 K left. If you run over the 128K limit, you may have to shorten some help text, etc.



Having completed our “Custom” language download, we now need to disable **Database Upload** mode on the Keypad Plus.

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Checking Our Results

Remember that our changes were loaded into the **CUSTOM** language; chances are good that the keypad is set for **ENGLISH** or some other language. We need to change the language specification to **CUSTOM**.

Language is specified by local keypad parameter #40.01; it also behooves us to save this selection into FLASH memory so that the next time we power-up the Keypad Plus, it will boot into the **CUSTOM** language.

Now if we browse over to parameter #70.00, we will see that our custom strings have been successfully downloaded!

Browsing only the Application Parameters

Menu 41 allows specification of up to 20 FILTER parameters; named **F01** through **F20**. When browsing is switched from NORMAL to FILTER via local Keypad parameter #40.06, only the specified filter parameters are browsed.

In FILTER browsing, only the UP and DOWN buttons function; the LEFT and RIGHT buttons are ignored.

In setting up the filtered browsing list, two menu 41 parameters are **FIXED**. Parameter #41.00 is a normal parameter zero and may be used at any time to enter the 3-digit Keypad Security code if required.

Parameter #41.21 is the “escape” parameter; essentially a clone of the NORMAL/FILTER parameter #40.06 mentioned above. This will allow you to escape the filtered browsing and return to unfettered access to all parameters in the drive and SM-Applications modules.

Any filter specifications left as 00.00 are ignored by the Keypad Plus. The filtered browsing will skip past them. In other words, you can have gaps in your list.

In this example, we want to specify parameters #70.00 through #70.06 as our filter list.

Filter parameters are entered in the following format: **S M M . P P**

S = slot number (1, 2, 3 or blank)

M M = menu number
P P = parameter number

If you don't specify a Slot number, the Keypad Plus will search for the first installed SM-Applications module and assign that Slot to the specification.

Some typical filter parameter specifications might be:

1.23	drive parameter #1.23 (preset speed 3)
13.02	drive parameter #13.02 (position error)
40.01	keypad parameter #40.01 (language select)
72.05	SM-Apps in first SM-Application Module installed slot #72.05 (PLC Register 6)
172.05	SM-Apps in Slot 1 parameter #72.05 (PLC Register 6)
386.04	SM-Apps in Slot 3 parameter #86.04 (Digital Output 1)

As an example, to insert our first filter parameter we browse to local keypad parameter #41.01 and insert the value 170.00

The other six filter parameters would be entered in exactly the same way, from the following list:

Filter Parameter	Value to be Entered	Description
#41.01	170.00	Move Command
#41.02	170.01	Target Position
#41.03	170.02	Maximum Speed
#41.04	170.03	Accel Time
#41.05	170.04	Decel Time
#41.06	170.05	Drum Diameter
#41.07	170.06	Gear Ratio

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To engage the filtered browsing, change local keypad parameter #40.06 to FILTER as shown directly below. As soon as you exit MODIFY mode, the keypad will revert to filtered browsing.

Before starting FILTER browsing, the Keypad Plus will always save both local keypad menus to FLASH memory. This means that if you detach the Keypad Plus and reattach it, it will boot directly into FILTERED browsing.

A typical FILTER browsing parameter looks like this:

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Right before the filter list rolls over, filter parameter F21 is displayed. This is the escape parameter and you have the chance to select NORMAL browsing and have unfettered access to all parameters again.

Making the FILTER List Read-Only

The previous filter list example can be made read-only by the following trick. Add to the list of filter parameters the Keypad Security Code parameter #40.07. If you want the non-local parameters to be read-only also, add the drive security status parameter #11.44 to the list.

The updated filter list would look like this:

Filter Parameter	Value to be Entered	Description
#41.01	170.00	Move Command
#41.02	170.01	Target Position
#41.03	170.02	Maximum Speed
#41.04	170.03	Accel Time
#41.05	170.04	Decel Time
#41.06	170.05	Drum Diameter
#41.07	170.06	Gear Ratio
#41.08	40.07	Keypad Security Code
#41.09	11.44	Drive Security Status

Now turn on filtered browsing (#40.06 = FILTER) and browse to filter parameter F08 (Keypad Security Code).

Enter a secret code, such as 747. As soon as you do this, the code will be hidden from sight and any local keypad parameters in the filter list will be READ-ONLY. This prevents you from changing the Keypad Security Code or the Escape parameter. All the other parameters can be modified.

If you wish the other parameters to be READ-ONLY too, use drive security beforehand to do that (see the Unidrive SP User's Manual). First you must have entered a drive security code into parameter #11.30 (or #00.34 in menu 0). Then while in filtered browsing, set filter parameter F09 to LOC (locked) and hit the red RESET button. Now you can't change anything because both drive and keypad security is engaged.

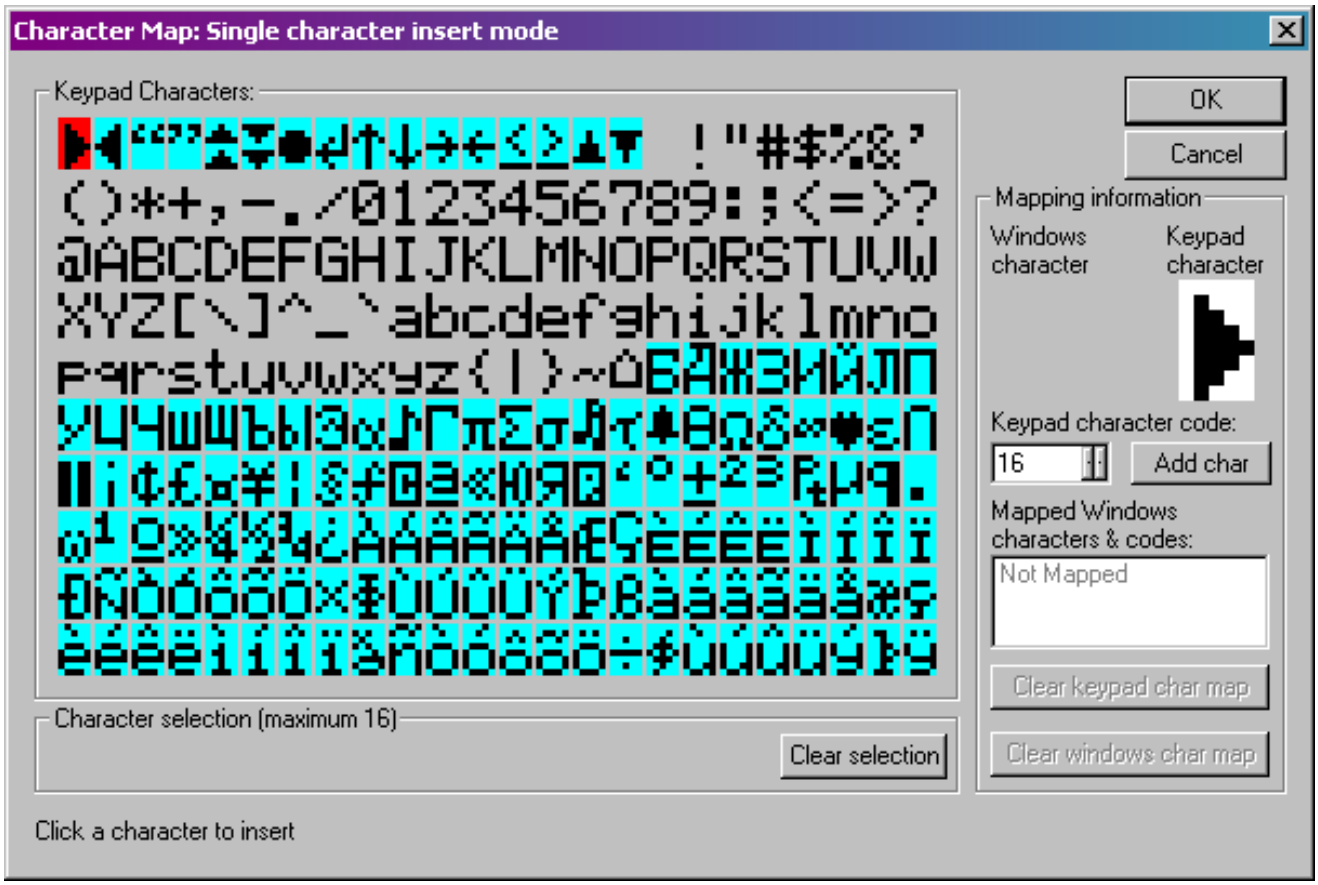
A notable exception is filter parameter F00. This is **not** READ-ONLY and always permits you to enter the secret Keypad Security Code (747 in this example) to escape the lockout.

To revert back to normal browsing, try to enter a value in a regular filter parameter, such as F01. It will ask you for a “code”, this is the Unidrive SP security code. Enter that value to unlock drive security and then browse to parameter zero in the filter menu (F00). Enter the 3-digit Keypad security code to unlock keypad security. Lastly, browse to the filter escape parameter F21. Set this parameter to NORMAL browsing and you now have unfettered access to all parameters.

This would permit you to establish a list of display parameters (such as motor RPM, current draw, etc) that the control room technician can browse but prevent the technician from being able to perturb any real drive adjustments. Display and status parameters are usually read-only by themselves so you might not have to turn on drive security via the above trick if this is the case.

Inserting Special Characters

The Keypad Plus has a large character generator with 240 characters available for your use, many of which may not be on the PC Keyboard you are using. The keypad character set is as follows:



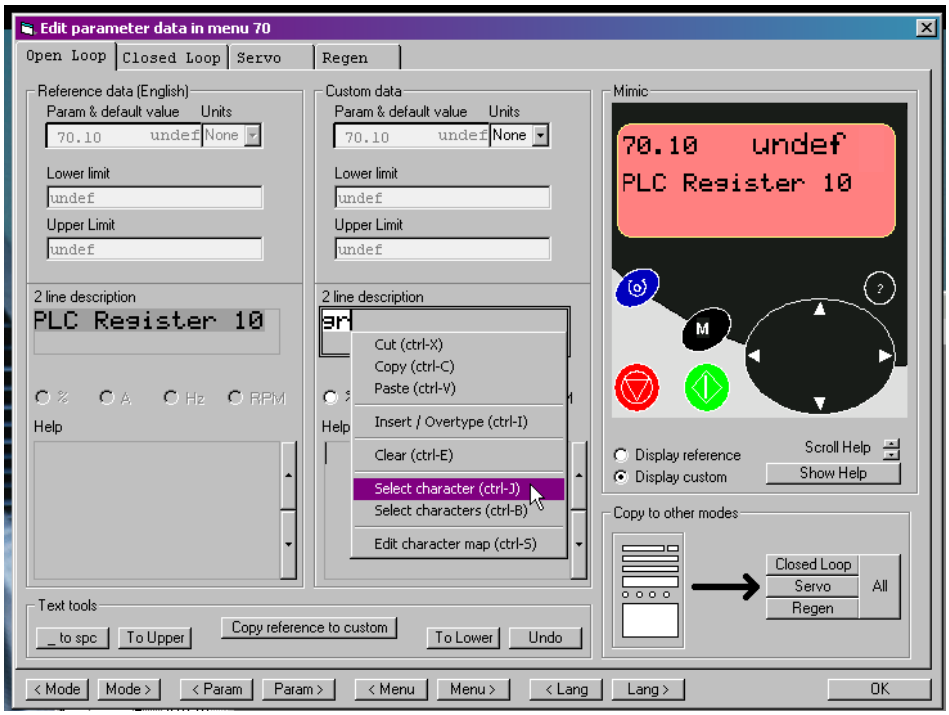
As our final topic, we will investigate how to enter a French expression into the description text that uses a couple of these special characters.

Suppose that we wished to enter the text “**grâce à Pierre**” which is “thanks to Pierre” in English.

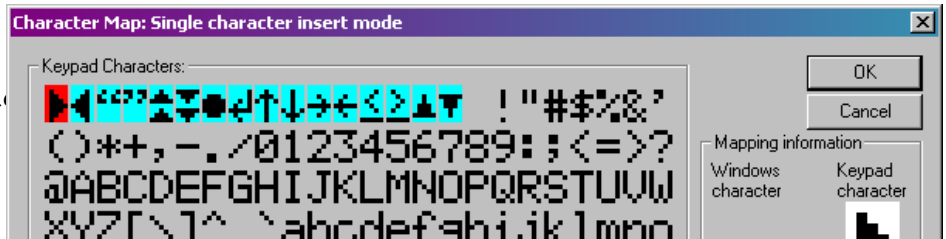
Note that the two letter a’s in the string are special characters shown above and can’t be entered by striking a key on the PC keyboard.

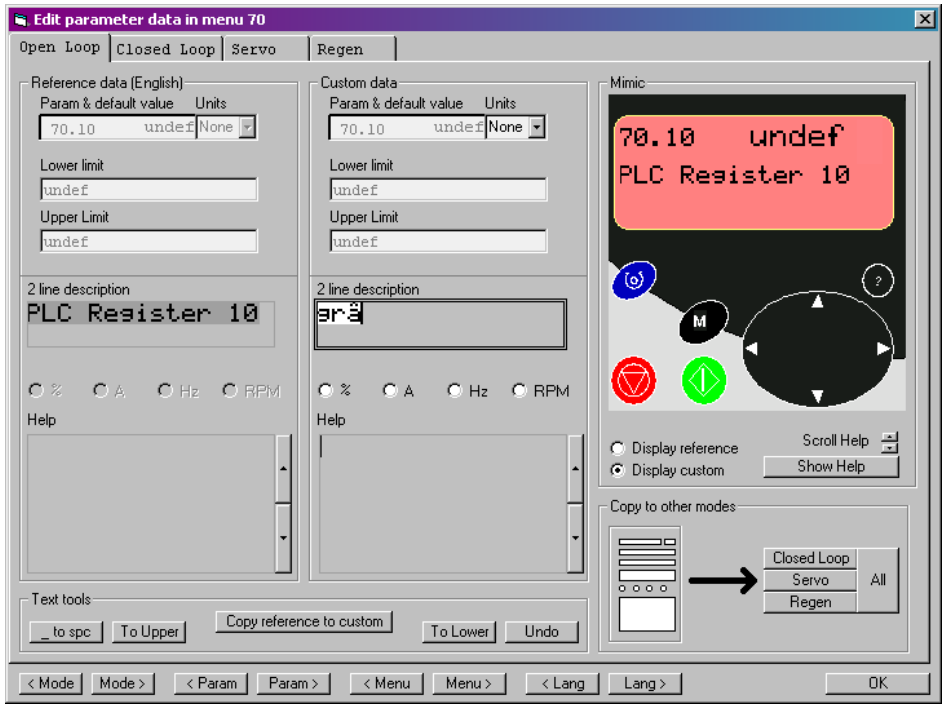
The editor window has a right-click pop-up menu that allows insertion of special characters.

Just before you type the first **a** in text “**grâce à Pierre**,” hit the right-hand mouse button to bring up the mouse pop-up menu.



Click on the mouse menu selection Select Character and the character set display will appear. Click on the character â and it will magically appear in our text string.





The other French accent character can be inserted the very same way.

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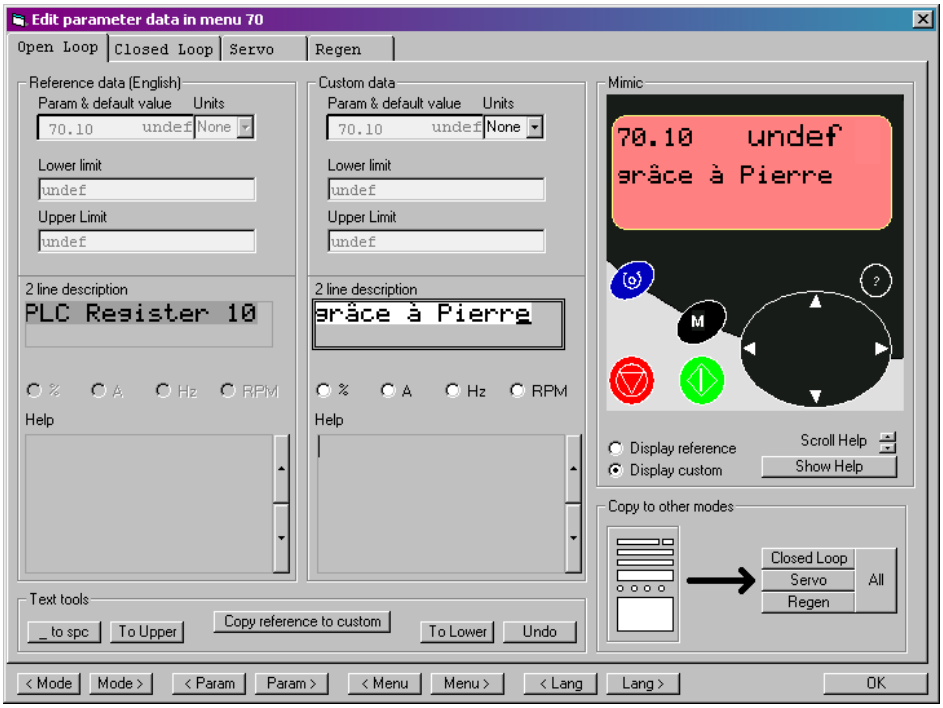
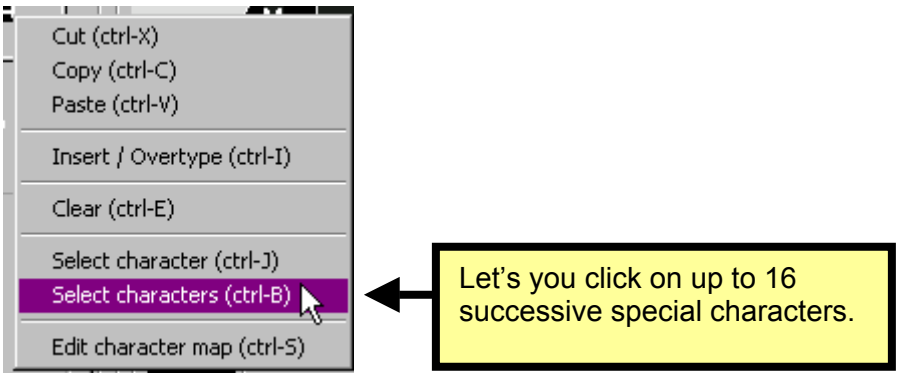


One final technique deserves mentioning. The right-click mouse menu has an “Insert Characters” selection. This allows you to click on 16 successive special characters and it will insert them all at the cursor position in your text.



Conclusions

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With an inexpensive CT Comms cable and a free Windows tool from Control Techniques, you can literally redesign the human-machine interface of a Keypad Plus – fitted Unidrive SP to your own specific application.

This will enable the drive to be more user-friendly and convenient to use. With the techniques discussed in this applications note, you can improve on our interface and **make it your interface**!

Good Luck.

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APPENDIX
LOCAL KEYPAD PLUS MENUS

Introduction

The Keypad Plus includes two local menus for setup and custom browsing. Menu 40 is a general setup menu for language selection, contrast and security settings, etc. Menu 41 allows the user to specify a custom-browsing list (filter parameters). These local menus follow, in sequence, the last Unidrive SP menu 22.

Table 1. Local Keypad Menus

#40.00	**Zero Parameter**	**Same as every other zero parameter**
#40.01	**Language Select**	**English, Custom, French, German, Spanish, Italian**
#40.02	**Keypad Software Revision**	**firmware revision (e.g 40102 is revision 04.01.02) (read-only)**
#40.03	**Save Configuration to Flash**	**Idle, Save, Restore, Defaults**
#40.04	**LCD Contrast**	**xxx = Contrast Setting (0 = minimum 31 = maximum)**
#40.05	**SmartCard Save/Restore**	**(not implemented)**
#40.06	**Browsing Filter**	**Normal Filter**
#40.07	**Keypad Security Code**	**xxx = PIN number to enable/disable keypad security**
#40.08	**Enable String DB Upload**	**Disable, Enable**
#40.09	**Hardware Key Security Code**	**range = 0 – 999 to match drive security code**
#40.10	**Keypad Serial Address**	**needs to match drive serial address**
#40.11	**Keypad Memory Size**	**4Mbit, 8Mbit (read-only)**

#41.00	**Zero Parameter**	**Same as every other zero parameter**
#41.01	**Browsing Filter F01**	**smmpp = any parameter (slot, menu, parm)**
#41.02	**Browsing Filter F02**	**smmpp = any parameter (slot, menu, parm)**
#41.03	**Browsing Filter F03**	**smmpp = any parameter (slot, menu, parm)**
#41.04	**Browsing Filter F04**	**smmpp = any parameter (slot, menu, parm)**
#41.05	**Browsing Filter F05**	**smmpp = any parameter (slot, menu, parm)**
#41.06	**Browsing Filter F06**	**smmpp = any parameter (slot, menu, parm)**
#41.07	**Browsing Filter F07**	**smmpp = any parameter (slot, menu, parm)**
#41.08	**Browsing Filter F08**	**smmpp = any parameter (slot, menu, parm)**
#41.09	**Browsing Filter F09**	**smmpp = any parameter (slot, menu, parm)**
#41.10	**Browsing Filter F10**	**smmpp = any parameter (slot, menu, parm)**
#41.11	**Browsing Filter F11**	**smmpp = any parameter (slot, menu, parm)**
#41.12	**Browsing Filter F12**	**smmpp = any parameter (slot, menu, parm)**
#41.13	**Browsing Filter F13**	**smmpp = any parameter (slot, menu, parm)**
#41.14	**Browsing Filter F14**	**smmpp = any parameter (slot, menu, parm)**
#41.15	**Browsing Filter F15**	**smmpp = any parameter (slot, menu, parm)**
#41.16	**Browsing Filter F16**	**smmpp = any parameter (slot, menu, parm)**
#41.17	**Browsing Filter F17**	**smmpp = any parameter (slot, menu, parm)**
#41.18	**Browsing Filter F18**	**smmpp = any parameter (slot, menu, parm)**
#41.19	**Browsing Filter F19**	**smmpp = any parameter (slot, menu, parm)**
#41.20	**Browsing Filter F20**	**smmpp = any parameter (slot, menu, parm)**
#41.21	**Browsing Filter Exit Parameter**	**Normal, Filter**

The local keypad menus and their associated parameters are contained within the Keypad Plus hardware. As such, saving the drive parameters (entering 1000 in any parameter 0 and hitting the red RESET button) will **NOT** save the local keypad parameters! Local parameter **#40.03** (Save Configuration to Flash) is provided for that purpose.

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Keypad Configuration Menu

#40.00 Zero Parameter numeric entry nnnnn

The local keypad Zero Parameter works like every other parameter zero in the Unidrive SP. Entry of a 4-digit number followed by a RESET will allow you to change drive operation modes, save drive parameters, etc.

There is one small difference. Three digit numbers are intercepted and used to unlock Keypad Security. If you had previously entered a Keypad Security code in local parameter #40.07, then you must enter the security code into local parameter zero to unlock Keypad Security. When Keypad Security is enabled, parameters #40.00 and #41.00 are the only ones you can change in the two local keypad menus.

#40.01 Language Select multiple choice (English, Custom, French, German, Spanish, Italian)

This parameter allows you to change the language (English, Custom, French, German, Spanish or Italian). If you have an older Keypad Plus with only 4 Mbit of Flash, you will only be able to specify English and Custom. This parameter is not automatically saved.

#40.02 Software Version numeric display nnnnn (read-only)

The current software revision of the Keypad Plus firmware is shown here. Revision **04.01.02** would be displayed as **40102**.

#40.03 Save Configuration to Flash multiple choice (Idle, Save, Restore, Defaults)

Permits storage and retrieval of local menus 40 and 41 to/from FLASH memory.

Idle	-	do nothing
Save	-	copies all of Menu 40 and 41 to FLASH memory
Restore	-	restores all of Menu 40 and 41 from FLASH memory
Defaults	-	sets all of Menu 40 and 41 to factory default values

After completion of a Save, Restore or Default operation, local parameter #40.03 will revert to “Idle” to give a visual indication that the operation completed successfully.

Avoid reading or writing to FLASH memory whilst the drive is running.

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#40.04 LCD Contrast numeric entry nn

Changes the contrast of the LCD Display

0 = minimum contrast (5 x 8 character backgrounds are quite visible)

32 = maximum contrast (5 x 8 character backgrounds are barely visible)

#40.05 SmartCard Save / Restore multiple choice (Idle, Save, Restore)

This parameter is not implemented as of now.

#40.06 Browsing Filter multiple choice (Normal, Filter)

Selects between normal browsing (all parameters) and filtered browsing.

Normal - access to all parameters in the drive and installed option modules
Filter - access to only those parameters specified in Menu 41 (20 maximum)

When filter browsing is chosen, the Keypad Plus immediately jumps to the first parameter F00 in the list provided by local menu 41. Parameter F00 is a standard parameter zero and is fixed. Parameters F01 through F20 are user-specified. Parameter F21 is a copy of this parameter (#40.06) and provides an escape from filtered browsing.

During filtered browsing, only the UP and DOWN arrows on the joypad are used, the LEFT and RIGHT arrows are ignored.

Any parameter on the Unidrive SP, the Keypad Plus or its attached option modules can be specified in the filtered browsing list in Menu 41. Any invalid filter parameter specifications, such as a parameter on an option module that is not fitted, will be ignored.

#40.07 Keypad Security Code numeric entry nnn

A three-digit code (1 – 999) that, once entered, renders all parameters in local menus 40 and 41 **READ-ONLY**. Once keypad security has been enabled, this parameter is also read-only and its value is displayed as zero to prevent unauthorized persons from seeing the code.

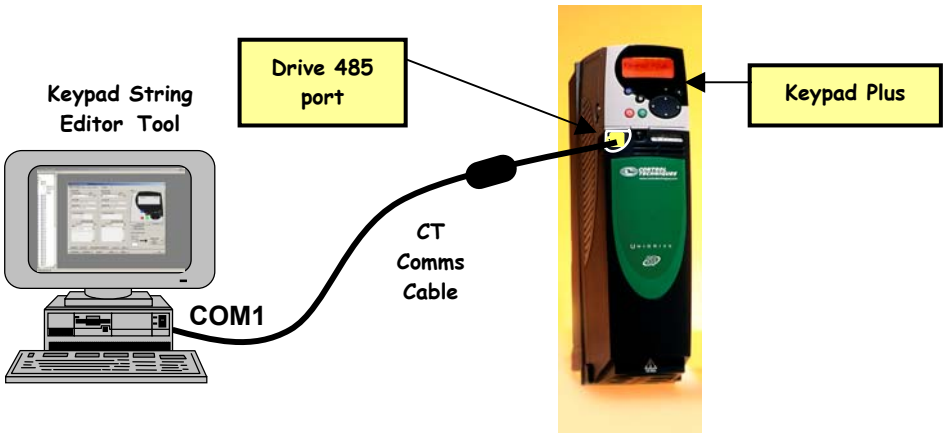
The only way to remove keypad security once it has been enabled is to enter the keypad security code into parameter zero of menu 40 or 41.

#40.08 Enable String DB Upload multiple choice (Disable, Enable)

Disable - Normal Keypad Plus operation
Enable - Keypad Plus devoted to custom string database upload only.

Allows upload of the “CUSTOM” language from a PC into the Keypad Plus FLASH memory. When string database upload is enabled, all normal Keypad Plus operations are stopped and the keypad waits for communication from the PC (browsing away from this parameter is not permitted).

A free “Keypad String Editor” tool is available on the Control Techniques website for use with this feature. The hardware setup is shown below. The relatively inexpensive CT Comms Cable is used to connect the PC tool to the drive.



The drive should be set to “inhibit” operational mode before commencing a upload. This upload operation takes about 15 minutes. When completed, return local parameter #40.08 to “disable” to resume normal Keypad Plus operations.

#40.09 Hardware Key Security Code numeric entry nnnn

A four-digit code (1 – 9999) that, if equal to the current Unidrive SP security code, bypasses drive security and allows read / write access to all drive parameters. Once a hardware key security code has been entered, this parameter **#40.09** becomes read-only and its value is displayed as zero to prevent unauthorized persons from seeing the code.

The hardware security code is automatically saved to FLASH memory.

The general idea is that a Keypad Plus can be programmed ahead of time with a hardware key security code that matches the drive security at a facility and one can just walk in and attach the Keypad Plus to any drive in the system and view and modify its parameters, without having to tamper with the resident security settings. One could imagine a Plant Manager having a drive system with security enabled and keeping in his office a Keypad Plus with the appropriate hardware key entered and saved. He may give this “magic” keypad to a visiting technician to make repairs without tampering with the drive system security settings or revealing the drive security code to anyone.

The only way to remove a Hardware Key Security Code is to successfully disable drive security first by entering the proper security code when a parameter is accessed for write operation.

#40.10 Keypad Serial Address numeric entry nn

The serial address is by default set to 01. This parameter allows it to be changed. This only matters when the Keypad Plus is fitted through the RS-485 port. When the Keypad Plus is plugged directly into the drive the serial address is forced to 01 in any case.

Making this change is a bit touchy. Plug the Keypad Plus into the RS-485 port and plug a standard LED Keypad directly into the drive. Browse to local parameter #40.10 on the Keypad Plus and browse to parameter #00.37 on the LED Keypad. Place both parameters into “modify” mode.

Increment the serial address from 1 to 2 on the Keypad Plus and then immediately increment the serial address on the LED Keypad. You should see both values change. Keep doing this in sequence until the desired serial address is attained.

#40.11 Keypad Memory Size display multiple choice (4 Mbit, 8 Mbit) (read-only)

Displays the FLASH memory size.

The Keypad Plus has been manufactured with 4 Mbit and 8 Mbit FLASH memory devices. Keypads fitted with 8 Mbit FLASH devices can support all six languages (English, Custom, French, German, Spanish and Italian). Older Keypad Plus units fitted with the smaller 4 Mbit FLASH devices can only support two languages (English, Custom).

Owners of older Keypad Plus units should note that the Keypad Plus String Editor tool can be used to copy any of the other languages into the “custom” language, giving a bilingual keypad (English and Spanish, for example).

Browsing Filter Menu

#41.00 Zero Parameter numeric entry nnnnn

The local keypad Zero Parameter works like every other parameter zero in the Unidrive SP. Entry of a 4-digit number followed by a RESET will allow you to change drive operation modes, save drive parameters, etc.

There is one small difference. Three digit numbers are intercepted and used to unlock Keypad Security. If you had previously entered a Keypad Security code in local parameter #40.07, then you must enter

the security code into local parameter zero to unlock Keypad Security. When Keypad Security is enabled, parameters #40.00 and #41.00 are the only ones you can change in the two local keypad menus.

#41.01 - #41.20 Browsing Filter Fnn Source numeric entry smm.pp

You may specify up to twenty parameters for the filter-browsing list. These parameters may be anywhere on the Unidrive SP or on any of the application modules fitted. You may also specify any local Keypad Plus parameter.

Any parameter specification set to zero will be skipped, so it is possible to have holes or gaps in your list with no harm done.

Filter parameters are entered in the following format: **S M M . P P**

S = slot number (1, 2, 3 or blank)
M M = menu number
P P = parameter number

If you don't specify a Slot number, the Keypad Plus will search for the first installed SM-Applications module and assign that Slot to the specification.

Some typical filter parameter specifications might be:

0.00	Skip this filter specification
1.23	drive parameter #1.23 (preset speed 3)
13.02	drive parameter #13.02 (position error)
40.01	keypad parameter #40.01 (language select)
72.05	SM-Apps in first SM-Application Module installed slot #72.05 (PLC Register 6)
172.05	SM-Apps in Slot 1 parameter #72.05 (PLC Register 6)
386.04	SM-Apps in Slot 3 parameter #86.04 (Digital Output 1)

Any illegal specifications will be ignored during browsing. This includes non-existent parameters or parameters associated with an option module that is not fitted.

When filtered browsing is enabled, the menu and parameter display **mmpp** is replaced by **F00 - F21 (**filter parameter numbers). This is to remind you that filtered browsing is in effect.

#41.21 Browsing Filter multiple choice (Normal, Filter) READ-ONLY

This is a duplicate of local parameter #40.06. It is fixed and read-only within Menu 41. This was left at the end of the list to remind users that the filtered browsing list will ALWAYS include an escape parameter to allow resumption of normal browsing.